

WHAT IS CLAIMED IS:

1. A method for forming a plurality of transistors proximate an outer surface of a semiconductor substrate comprising:

forming a collector region of a bipolar transistor and a well region of a first
5 field effect transistor by implanting ions having a first conductivity type in a first common ion implantation step;

forming a base region of the bipolar transistor and doping the channel region of a second field effect transistor by implanting ions having a second conductivity type using a second common ion implantation step; and

10 forming an emitter region of the bipolar device and source and drain regions of the second field effect device by implanting ions of the first conductivity type into the outer surface of the substrate using a third common ion implant step.

2. The method of Claim 1 wherein the third common implant step is also
15 used to form a collector contact region proximate the outer surface of the substrate and electrically coupled to the collector region.

3. The method of Claim 1 and further comprising the step of forming source and drain regions of the first field effect device and forming a base contact
20 region by implanting ions of the second conductivity type into a region of the outer surface of the substrate using a fourth common ion implant step.

4. The method of Claim 1 wherein the ions of the first conductivity type comprise n-type ions and the ions of the second conductivity type comprise p-type
25 ions.

5. The method of Claim 4 wherein the p-type ions comprise boron ions.

6. The method of Claim 4 wherein the n-type ions comprise ions chosen
30 from a class consisting of phosphorous and arsenic.

7. The method of Claim 1 wherein the semiconductor substrate is doped with ions of the second conductivity type such that the collector region is junction isolated from other electronic devices formed in the substrate.

5 8. The method of Claim 1 and further comprising the step of forming a isolation insulator body proximate the outer surface of the substrate and disposed between the collector region and the emitter region.

9. The method of Claim 1 and further comprising the step of forming a
10 isolation insulator body proximate the outer surface of the substrate and disposed between the emitter region and a base contact region electrically connected to the base region.

10. The method of Claim 1 and further comprising the step of forming a
15 sacrificial gate stack structure disposed outwardly from the outer surface of the substrate and disposed between the emitter region and a base contact region disposed proximate the outer surface of the substrate and electrically coupled to the base region.

11. An integrated electronic device comprising a plurality of active electronic devices formed in a single semiconductor layer doped with ions of a first conductivity type, comprising:

5 a first field effect device comprising a gate stack structure disposed proximate the outer surface of the semiconductor substrate, the first field effect device comprising source and drain regions comprising ions of a second conductivity type, the source and drain regions disposed proximate opposing edges of the gate stack structure, the first field effect device disposed in a well region comprising ions of the first conductivity type, the well region disposed in the outer surface of the
10 semiconductor layer;

a second field effect device comprising source and drain regions comprising ions of the second conductivity type, the second field effect device comprising a second gate stack structure disposed on the outer surface of the semiconductor layer and disposed between the source and drain regions of the second field effect device,
15 the second field effect device disposed in a well region comprising ions of the first conductivity type; and

a bipolar device comprising a collector region comprising ions of the second conductivity type, the collector region and the well region of the first field effect device formed using a first common implant process, the bipolar device further
20 comprising a base region comprising ions of the first conductivity type, the base region formed using an ion implant process which is also used to form the second field effect device, the bipolar device further comprising an emitter region comprising ions of the second conductivity type, the emitter region and the source and drain regions of the second field effect device formed using a second common ion implant
25 process.

12. The device of Claim 11 wherein the third common implant step is also used to form a collector contact region proximate the outer surface of the substrate and electrically coupled to the collector region.

30

13. The device of Claim 11 wherein the source and drain regions of the first field effect device and a base contact region are formed by implanting ions of the

second conductivity type into a region of the outer surface of the substrate using a fourth common ion implant step.

14. The device of Claim 11 wherein the ions of the first conductivity type
5 comprise n-type ions and the ions of the second conductivity type comprise p-type ions.

15. The device of Claim 14 wherein the p-type ions comprise borons.

10 16. The device of Claim 14 wherein the n-type ions comprise ions chosen from a class consisting of phosphorous and arsenic.

17. The device of Claim 11 wherein the semiconductor substrate is doped
with ions of the second conductivity type such that the collector region is junction
15 isolated from other electronic devices formed in the substrate.

18. The device of Claim 11 and further comprising an isolation insulator
body proximate the outer surface of the substrate and disposed between the collector
region and the emitter region.
20

19. The device of Claim 11 and further comprising an isolation insulator
body proximate the outer surface of the substrate and disposed between the emitter
region and a base contact region electrically connected to the base region.

25 20. The device of Claim 11 and further comprising a sacrificial gate stack structure disposed outwardly from the outer surface of the substrate and disposed between the emitter region and a base contact region disposed proximate the outer surface of the substrate and electrically coupled to the base region.

21. A method for forming a plurality of transistors proximate an outer surface of a semiconductor substrate comprising:

forming a collector region of a bipolar transistor and a well region of a first field effect transistor by implanting ions having a first conductivity type in a first common ion implantation step;

forming a base region of the bipolar transistor and doping the channel region of a second field effect transistor by implanting ions having a second conductivity type using a second common ion implantation step;

forming an emitter region of the bipolar device and source and drain regions of the second field effect device by implanting ions of the first conductivity type into the outer surface of the substrate using a third common ion implant step;

forming a collector contact region proximate the outer surface of the substrate and electrically coupled to the collector region using the third common implant step; and

forming source and drain regions of the first field effect device and forming a base contact region by implanting ions of the second conductivity type into region of the outer surface of the substrate using a fourth common ion implant step.

22. The method of Claim 21 wherein the ions of the first conductivity type comprise n-type ions and the ions of the second conductivity type comprise p-type ions.

23. The method of Claim 22 wherein the p-type ions comprise borons.

24. The method of Claim 22 wherein the n-type ions comprise ions chosen from a class consisting of phosphorous and arsenic.